Upconversion-based lidar measurements of atmospheric CO2 - DTU Orbit (09/11/2017)

Upconversion-based lidar measurements of atmospheric CO2

For the first time an upconversion based detection scheme is demonstrated for lidar measurements of atmospheric CO2-concentrations, with a hard target at a range of 3 km and atmospheric backscatter from a range of similar to 450 m. The pulsed signals at 1572 nm are upconverted to 635 nm, and detected by a photomultiplier tube, to test how the upconversion technology performs in a long range detection system. The upconversion approach is compared to an existing direct detection scheme using a near-IR detector with respect to signal-to-noise ratio and quantum efficiency. It is for the first time analyzed how the field-of-view of a receiver system, for long range detection, depends critically on the parameters for the nonlinear upconversion process, and how to optimize these parameters in future systems. (C) 2016 Optical Society of America

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